Strategies for Addressing Supply Interruption – Natural Gas Storage and Pipeline Slack Capacity

California Resources Agency

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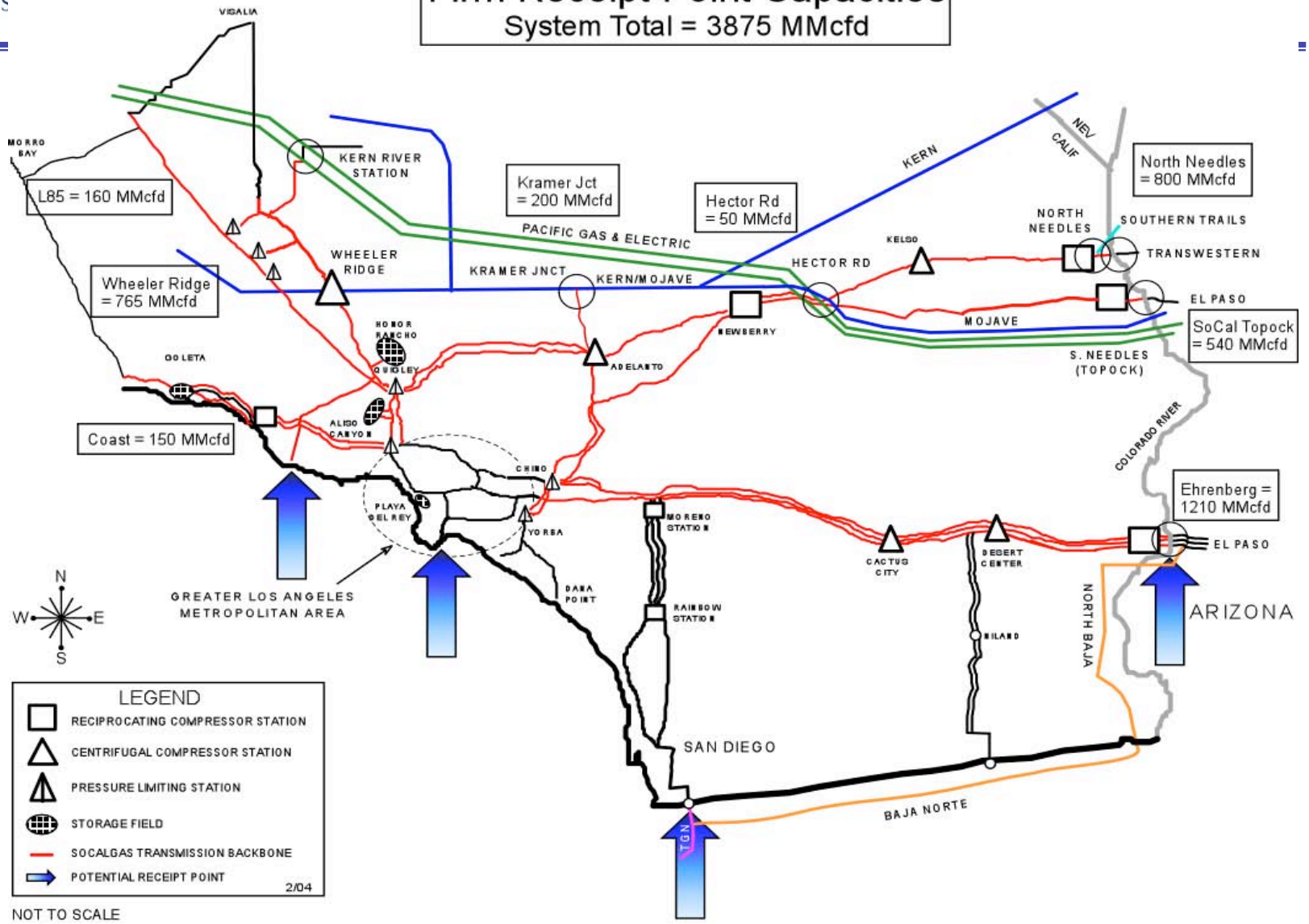
Firm Receipt Point Capacities
System Total = 3875 MMcfd



NOT TO SCALE

Supply Interruption – Considerations

- SoCalGas/ SDG&E gas transmission system relies on flowing supply and storage injection/ withdrawal to balance supply and demand;
  - Storage withdrawal makes up for supply shortfalls
  - Receipt point capacity of 3.875 Bcfd
  - Storage Withdrawal capacity from 3.125 Bcfd to 2.555 Bcfd depending storage inventory
  - Demand ranges from 1.9 to over 5 Bcfd
- With or without new receipt points, system operations requires a combination of flowing supply and storage withdrawal to meet demand on high demand days
  - Minimum System flowing supply requirement
  - Minimum Blythe flowing supply requirement

Supply Interruption – Considerations

- The Gas Transmission system is flexible;
  - Multiple paths and sources of supply to meet demand
  - Takes 2 to 8 hours to react to large changes in supply depending on magnitude of demand
- Current supplies enter system at remote locations away from demand centers;
  - Gas supply at Otay Mesa and Long Beach will enter directly into demand centers (less time to react)
- Today, the Scheduling process allows for changes in delivered volumes 4 times for each gas day
  - Large changes are more difficult to adjust to
- Additional sources of supply can improve system reliability if flows are consistent
  - Could especially be true at Otay Mesa for San Diego

Supply Interruption - Considerations

- Large new receipt points (regasified LNG or other) are viewed operationally as another supply source equivalent to existing pipeline interconnects
  - Uniform hourly flow
    - Maximizes available pipeline capacity
    - Stablizes system balancing in real time
  - Reliable deliveries
    - schedule what flows; flow what is scheduled
- Ability to react to large gas supply interruptions depends on whether an interruption is planned or unplanned, and the magnitude of demand

Supply Interruption – Planned

- Planned loss of supply can be accommodated under most scenarios
  - Customers can change source of supply through normal scheduling process by utilizing available excess capacity at other receipt points
  - Modest changes in scheduled volumes are known by operators sufficiently in advance to turn system around if necessary
  - Large changes in intraday scheduled volumes can be difficult to accommodate due to the large effective change in real time flows
- Impact of a ship delay
  - Should know a day or two in advance
  - Can be handled through the normal scheduling process

Supply Interruption - Unplanned

- Unplanned supply interruptions can only be made up in the short run by storage withdrawal
  - Example – Carlsbad rupture on El Paso
- Gas supply loss @ Oxnard/ Ventura
  - Sufficient distance from major demand centers to allow system to be turned around under most scenarios
- Gas supply loss @ Long Beach
  - Feeds largest demand center
  - Fast response of storage withdrawal necessary from local storage fields
  - On high demand day, gas supply interruption may be difficult to overcome, increasing risk of curtailment

Supply Interruption - Unplanned

- Gas supply loss @ Otay Mesa
  - Feeds demand center directly (San Diego)
  - Requires maintaining sufficient pipeline pack in Blythe system to turn gas system around and/ or backfeed from Chino/ Prado
  - Gas supply interruption on high demand day may be difficult to overcome, with increased risk of curtailment
  - However, no different than a sudden loss of supply from the north
- Gas supply loss @ Ehrenberg
  - Blythe minimum still a requirement to meet Imperial Valley and most of San Diego demand
  - Complete loss of supply could lead to curtailments
  - Note redundant supply source potential with North Baja, L1903 and El Paso southern system all capable of feeding point

Supply Interruption - Summary

- In general, more sources of supply enhance system supply reliability; opportunity to go to other points for supply
- Planned loss of supply
  - can be handled under most scenarios provided minimum flowing supply requirements are met
- Unplanned loss of supply
  - Loss of supply from any receipt point difficult to overcome on high demand days
  - Reaction more difficult at Long Beach, Otay Mesa, and Ehrenberg supply locations due to less time to react or minimum flowing supply requirement
- High reliability will be required from any new supply source